



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material[®] 2887

Polyethylene

(M_w , 196 400 g/mol)

This Standard Reference Material (SRM) is intended primarily for use in calibration and performance evaluation of instruments used to determine the molar mass* and molar mass distribution by size exclusion chromatography. A unit of SRM 2887 consists of approximately 0.3 g of polyethylene powder. The certified values and uncertainties for mass-average molar mass and intrinsic viscosity are presented in Table 1.

Table 1. Certified Properties

Property	Certified Value
Mass-Average Molar Mass* (M_w)	$196.4 \times 10^3 \text{ g/mol} \pm 13.7 \times 10^3 \text{ g/mol}$
Intrinsic Viscosity $[\eta]$ in 1,2,4-trichlorobenzene at 130 °C	$276.9 \text{ mL/g} \pm 3.1 \text{ mL/g}$

* Previously expressed as molecular weight [1].

Certified Values and Uncertainties: The certified value for M_w was originally measured using static light scattering with 1-chloronaphthalene as the solvent at 130 °C [3]. The certified value for the intrinsic viscosity was determined in 1,2,4-trichlorobenzene at 130 °C.

The certified measurement uncertainty is expressed as a combined expanded uncertainty with a coverage factor, $k = 2$, calculated in accordance with NIST procedure [2]. Type A and Type B contributions to the expanded uncertainty of the measured mass-average molar mass include the uncertainties in the Rayleigh ratio of the scattering standard, optical alignment, and calibration of the differential refractometer.

Expiration of Certification: The certification of SRM 2887 is valid until **01 January 2008**, within the measurement uncertainties specified, provided that the SRM is handled in accordance with the storage instructions given in this certificate. This certification is nullified if the SRM is modified or contaminated.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before expiration of this certificate, NIST will notify the purchaser. Return of the attached registration card will facilitate notification.

The technical coordination leading to certification of this SRM was provided by B.M. Fanconi of the NIST Polymers Division. Technical measurement and data interpretation were provided by C.M. Guttman, W.R. Blair, J.R. Maurey, and C.R. Schultheisz of the NIST Polymers Division.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the NIST Standard Reference Materials Program by J.W.L. Thomas.

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Certificate Issue Date: 06 April 2001
SRM 2887

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Storage: The SRM should be stored in the original bottle with the lid tightly closed and under normal laboratory conditions.

Homogeneity and Characterization: The homogeneity of SRM 2887 was tested by size exclusion chromatography analysis of solutions in 1,2,4-trichlorobenzene at 130 °C. The characterization of this polymer is described in Reference 3. SRM 2887 is the result of a clean-up, blending, and rebottling of the fractionation of SRM 1475. It was produced in the same fractionation as SRM 1482, SRM 1483 and SRM 1484 [4].

REFERENCES

- [1] Taylor, B.N., "Guide for the Use of the International System of Units (SI)," NIST Special Publication 811, 1995 Ed., (April 1995).
- [2] *Guide to the Expression of Uncertainty in Measurement*, ISBN 92-67-10188-9, 1st Ed. ISO, Geneva, Switzerland, (1993); see also Taylor, B.N. and Kuyatt, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington DC, (1994); available at <http://physics.nist.gov/Pubs/>.
- [3] Guttman, C.M., Maurey, J.R. , and Blair, W.R., "Certification of the Relative Molecular Mass and the Intrinsic Viscosity of SRM 2887, a Polyethylene of Narrow Molecular Mass Distribution," NISTIR 6456.
- [4] Verdier, P.H. and Wagner, H.L., "The Characterization of Linear Polyethylene SRM's 1482, 1483, and 1484, I. Introduction," NBS Special Publication 260-61, (December 1978); or National Bureau of Standards, *Journal of Research*, **83**, No. 2, pp. 169-171, (1978).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet <http://www.nist.gov/srm>.